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Tariff Rates, Tariff Revenue, and Tariff Reform

Some New Facts

Lant Pritchett
and
Geeta Sethi

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The ad valorem tariff rates on specific products and the ratio of tariff revenue to import value, the collected rate, are only tenuously related, contend Pritchett and Sethi.

Using tariff and revenue data (at the tariff code line level of detail) for three developing countries, Pritchett and Sethi compare the statutory ad valorem tariff rates (official rates) with the ratio of tariff revenues to import values (collected rates). They document four facts:

- The collected rate for any given item of the tariff code has almost no relationship to the official rate for that item.

- The variation of collected rates around the official rate increases as the level of the official rate increases.

- The collected rates increase much less, on average, than one-for-one with the official rates.

- Above a certain level, collected rates do not increase at all despite increases in official rates. Collection rates appear to level off at roughly 50 percent. (In Kenya, collected rates are lower for high-tariff than for moderate-tariff items. Assigning lower rates for high-tariff items would actually increase revenue on those items.)

The implications of these findings are twofold for calculating general revenue:

- Rates are not the critical determinant of revenues. The revenue implications of large rate changes can be offset by modest changes in the system of exemptions, for example. The benefit of eliminating exemptions is primarily transparency. The costs of programs that provide import exemptions for, say, regional promotion, are often hidden in customs statistics.

- If pressures that cause collected rates not to increase one-for-one with tariff rates will continue to be present in any tariff regime, then these must be factored into tariff reform design.

Tariff Rates, Tariff Revenue and Tariff Reform: Some New Facts

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Tariff rates, Tariff revenue and Tariff reform: Some New Facts

Tariff reforms are one aspect of the package of trade policy reform supported by World Bank adjustment lending. Tariff reforms aim to rationalize the tariff code, reduce the dispersion of rates, and lower the average tariff rate. However, since many tariff reforms are undertaken during periods of stabilization and fiscal austerity, the potential loss of tax revenues from lowering and unifying tariff rates has been perceived as an important constraint on tariff reform (Rajaram 1992, Mitra, 1992).

This paper uses data from three developing countries at the tariff code line level of detail to examine the relationship between tariff revenues and tariff rates. We construct for each item of the tariff code the ratio of import tax revenues to import value, the "collected rate" of tariffs. Comparing these collected rates to the official statutory rates of the tariff code we demonstrate four facts about the relationship between tariff rates and tariff revenues[1].

- Collected and official tariff rates are almost completely unrelated. In pre-reform countries, differences of official rates of tariff explain only a quarter of the variation in collected rates.
- The variance of collected rates increases strongly with the level of the statutory rate.
- The collected rate increases much less than one for one with increases in the statutory rate.

[1] The words "official" or "statutory" rate of tariff are used interchangeably to mean the ad valorem rate recorded as "the" rate for each tariff code item. Of course, in many cases, different rates are specified within the tariff code for the same item, with exceptions granted (or changes added) depending on country of origin or end use. For simplicity, we refer to these as exceptions from the "official" rate.

- Above a certain level of the official tariff rate, further increases in the official tariff rate produce no increase (and there is some evidence of a decrease) in the collected rate.

One way to frame the four facts is that one might suppose if all tariff revenue were collected, that, in principle, a relationship would exist such that for the i^{th} item:

$$\text{Collected rate}^i = \alpha + \beta * \text{official rate}^i + e^i,$$

the explanatory power of this relationship is high, $\beta = 1$, and the relationship is linear. But our research shows otherwise: the explanatory power is low, β does not equal 1, the relationship is not linear, and, incidentally, e^i does not have a constant variance.

We argue that these facts represent general features of pre-reform tariff codes in developing countries, with two immediate implications. In reforms of the entire system of tariffs and tariff revenue collection, the change in official rates of tariff, especially at the high levels, is likely to be the least important element for revenue. Changes in procedures for assessment of import value, granting of exemptions, and collections are likely to be much more important. Second, simulations that assume that tariff revenues fall one for one with rates (such as those supported by the Bank's SINTIA software) overstate the impact of rate reductions on revenues by assuming constant collection rates. The impact on revenue needs to carefully assess the exemption status of imports.

This paper has six sections and a conclusion. The first section describes the data and the tariff regime in Pakistan, Kenya, and Jamaica, the countries for which tariff line level data on revenue is available. The next four sections present the evidence for each of the four stylized facts listed above. The sixth section discusses evidence from other countries suggesting these four features are general to pre-reform tariff systems in LDCs. The conclusion summarizes and

discusses the implications for the analysis of the relationship between revenues and tariff reform.

I) Tariff regimes and data on tariffs, collections, and value

As part of ongoing research on tariff reform we have collected data on tariffs at the tariff code line level for a large number of countries (see Pritchett and Sethi, 1992). For three of these countries, Pakistan, Kenya, and Jamaica, we have been able to obtain official rates of duty, import values and import duty collected. Table 1 summarizes some characteristics of the tariff code(s) for these three countries. The second column gives the number of separate items distinguished in the tariff nomenclature of the countries. These tariff codes are quite detailed and distinguish between 3,000 and 5,000 items[2].

Table 1: Basic facts on the tariff code

	Number of tariff items with imports	Number of official rates	Average rate of the: official	collected
Pakistan	4317	15	42	32
Kenya	3392	33	22	13
Jamaica	3303	10	16	12

Notes: The average of the official rates is import weighted. Items with zero import value are excluded.

The third column indicates the total number of rates of import duty for each country. In addition to import duty, various fees (e.g. customs processing fees) and additional taxes (e.g.

[2] Tariff nomenclatures for individual countries are based either on the Brussels or the new Harmonized System. Countries then further differentiate products to the six, eight or ten digit level. The number of items distinguished in the tariff code varies across countries, from as few as 2000 to over 12,000 (see Pritchett and Sethi, 1992).

excise, sales, or luxury) may be levied and collected on imports at the port of entry. We focus only on the component of import duties as the others are either small, do not vary across items or are not import taxes. Our collection numbers correspond as closely as possible to these import duties[3].

The last two columns present the import value weighted mean of the statutory tariff rate and the average collected rate[4]. The import weighted tariff rate gives the hypothetical revenue, that is the revenue from the tariff code if all import taxes were collected at the official rate. As with other countries, actual revenues are far below this hypothetical as the average official rate is almost twice as high as the average collection rate. The difference between hypothetical and actual revenue is due to exemptions[5]. Since both revenues and import values are taken directly from customs statistics, tariff losses from smuggling, the underdeclaration of import values (underinvoicing) and the misdeclaration of items are omitted. To the extent that these are important, we understate the gap between actual revenues and those that would be collected if all imports were paid on the official tariff. The differences we examine are entirely due to recorded exemptions from the tariff code.

The three countries were at various stages of their trade reforms in the tariff codes we use. Jamaica had already had several rounds of tariff reform, with reductions in the average rate. Kenya's trade reform has mainly focused on import licensing to date, including some

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[3] For Jamaica, import revenue is from Common External Tariff (CET). For both Kenya and Pakistan, the revenues are based on collection from just customs duty.

[4] Tariff code items with zero import value were excluded from the all calculations are the collected rate could no be constructed.

[5] At this stage we'll just define exemptions this way. What these exemptions constitute will be discussed below.

tariffication that has raised the unweighted average. Pakistan's tariff code has already undergone substantial rationalization as part of their adjustment efforts.

II Collected rates and statutory rates: not even cousins

Official rates have almost no influence on tariff code items at collected rates across tariff line items. For a few selected levels of the official tariff rate, Table 2 presents the number of items at this tariff rate, the mean collected rate of items at this rate, the standard deviation and coefficient of variation and the 25th and 75th percentile. These results heuristically preview a number of the results to be presented statistically later in the paper, the interesting feature in the present context is the huge variation of collected rates for items with the same official rate. For example, in Pakistan the mean collected rate for the 899 items with a tariff rate of 80% is 51%, but the standard deviation is 31. One quarter of the 80% rate items paid duty less than 21% while one quarter paid a duty above 78%. For the 495 items with a 100% tariff, one quarter paid less than 7% while one quarter paid more than 94%. Similarly for Kenya, among the 429 items with a tariff rate of 50% the mean collected rate is only 26%, one quarter paid less than 6%, one quarter paid more than 26%, and the standard deviation is 27.

Table 2: Summary Statistics of Collected Rates
By Level of Official Rate

Official rate	Number of items	Mean Collected	Standard Deviation (C.V.)	25th percentile	75th percentile
Pakistan					
20	547	15	14 (92)	5	20
40	789	32	18 (56)	5.46	40
60	267	40	21 (53)	23	58
80	899	51	31 (61)	21	78
100	495	52	40 (76)	7	94
125	605	54	47 (88)	3	95
Kenya					
20	331	5	10 (194)	0	3
30	950	9	14 (156)	0	22
40	435	20	20 (101)	0	24
50	429	26	27 (106)	6	26
60	206	43	39 (92)	26	56
80	306	31	30 (95)	26	31
100	108	36	37 (102)	4	34
Jamaica					
10	1375	7	7 (91)	3.18	10
30	517	16	12 (76)	5	26
45	662	24	17 (72)	7	44

The fact that the variation of collected rates even for the same official rate is so large suggests that there is very little systematic relationship between the statutory tariff levels and actual collection rates. Table 3 illustrates that statement statistically. An analysis of variance

(ANOVA) decomposed the variation of the collected rates of individual items about the overall mean into a component associated with variations in official rates and the fraction of the variation of collected rates that actually occurs for items with the same official rate[6]. For Pakistan only 23% of the collected rate variance is explained by official rates; for Kenya this is only 27% and for Jamaica, after several rounds of tariff reform, the number is up to 31%. Typically less than one quarter of the variation of the tariff revenues collected across products is related to variations in the official rates. This low explanatory power is especially surprising given the enormous variation in the official rates.

Table 3: Explanatory power of official rate for collected rate

Functional Form:	Pakistan	Kenya	Jamaica
ANOVA	.23	.27	.31
Regression R-squared			
Linear	.16	.21	.29
Log-Log	.18	.24	.30
Linear, with spline	.22	.22	.29
Quadratic	.20	.21	.29

Notes: Functional forms of regressions of collected rate (CR) on the official rate (OR) are: Linear, $CR = \alpha + \beta *OR$; Log-Log, $\ln(CR) = \alpha + \beta *\ln(OR)$; Linear with spline, $CR = \alpha + \beta *OR + \beta *(OR-t^*)$, where t^* is the level of official tariff at which the slope changes; Quadratic, $CR = \alpha + \beta *OR + \beta 1*OR^2$.

[6] Since the official rate is a discrete variable (the number of different levels is given in table 1) it can be treated as a "treatment" variable in a traditional analysis of variance.

An alternative procedure is to assume some relationship between the collected rate and the official rate of the form:

Collected rate = f (official rate).

If the collected rate were primarily a function of the tariff rate, one would expect a relationship of this type to have high explanatory power. The second to fifth lines of Table 3 report the R-squared of a regression of collected rates on statutory rates for a variety of functional forms for each country. The number is very low[7], confirming the results of the analysis of variance. For Kenya and Pakistan the R^2 is uniformly below 25% while for Jamaica it is roughly 30%. A low R-squared across the various forms reveals that little of the variation in collections is related to variations in official rates.

III) Increasing variation of the collected rate

The second fact is that the variation of the collected rate of items with the same official rate increases with the level of the official rate. In Table 2 we can see that for each country the standard deviation increases substantially. For instance, in Kenya, when the tariff is 20% the standard deviation is 10, increasing to 20 at 40% and 39 at 60%. Of course, since the standard deviation is not scale invariant this is not altogether surprising. The coefficient of variation (in parenthesis in column 4 of Table 2) divides the standard deviation by the mean to achieve a scale invariant number. The coefficient of variation indicates that not only do higher statutory rates have higher absolute deviations, but, except for the lowest rates, they are generally larger as a fraction of the mean value as well.

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[7] Since the regression formulations impose additional structural restrictions on the relationship, the R^2 will be lower than the ANOVA.

Table 4 reports statistical tests of increasing variance in several forms. In the first row are the results of an ANOVA with the levels of the official rate as the treatment variable and the variance of collection rates as the dependent variable (as opposed to the level in Table 3). We find that the level of the official tariff is at least as successful in explaining the variation of collected rates around the official rate as it was in explaining actual collections, as the ANOVA "fraction explained" of .41, .13 and .42 are substantially higher than those in Table 3 for Pakistan and Jamaica. We can predict with more confidence that increasing the tariff will increase the variance that it will raise mean collections. In the following rows, the absolute value (or squares) of the residuals of the collection rate regressed on the statutory level of the tariff are themselves regressed on the level of the statutory rate[8]. The explanatory power of the log-log specification shows that the percentage variation of the residual increases along with the absolute level.

Table 4: Variance of Collected Rates and the Level of Official Tariff

	Pakistan	Kenya	Jamaica
ANOVA	0.41	0.13	0.42
Regression form R^2:			
$\|e^i\|$ (linear)	0.38	0.08	0.41
$\|e^i\|$ (log)	0.41	0.10	0.42
$(e^i)^2/s^2$	0.21	0.04	0.24
Notes: Row 2 regresses the absolute values of the residuals of the linear regression on the official rate. Row 3 regresses the absolute values of the log-log regression on the log official rate. Row 4 regresses the normalized squared residuals of the linear regression on the official rate.			

[8] This is essentially a test of heteroskedasticity of the error term, which in this case is not so interesting in its own right.

IV) Higher rates, not higher revenues

There are a number of good reasons to believe that tariff revenues will not increase one for one with increases in tariff rates. To the extent that the good itself has some elasticity with respect to the tariff rate the value of the import in a category will decrease with an increase in the tariff rate (ceteris paribus, of course). A second revenue elasticity is relevant as the value of imports reported for tariff purposes will decline, even for a given level of actual imports, because underinvoicing and smuggling as the tariff rises.

This study documents a third channel. Even for a given value of imports declared to customs, the ratio of imports coming in with exemption will increase as the tariff rate increases. This will happen for at least three reasons. First, even under a fixed set of exemptions (say a scheme that provides exemptions to exporters), as the tariff is raised, the value of imports coming in under non-exemptions will decrease (with the magnitude depending on the price elasticity of the non-exempt goods) while the value coming in under exemption will remain constant, and this will increase the fraction under exemption. Second, the incentive to lobby for exemptions will increase with the level of tariffs. Exemptions either for specific types of goods, for specific importers, or just plain discretionary are endemic in tariff systems. In a situation in which the lobbying for exemptions and the degree of exemptions granted is endogenous, an increase in the rate will increase the fraction of imports coming in under exemption as exemptions increase. Finally the temptations for abuse of any system of exemptions will increase with the level of the tariff. For instance, exemptions are commonly granted to exporters, or diplomatic missions and charitable activities, or to returning residents. The higher

the tariff, the larger the incentive for false diversion of imports under any scheme into other channels.

This third channel for low revenue elasticity to tariff changes is potentially quite important, as seen in Table 2. For Pakistan, the mean of the collected rate for items with a 60 percent tariff is 40 percent. For items with an 80 percent tariff, the mean of the collected rate increases only to 51 percent and then is roughly the same (52 and 54 percent) for items with official rates of 100 and 125 percent. In Kenya, the mean of the collection rate decreases from 43 percent at 60 percent official to 31 percent at 80 percent and 36 percent at 100 percent.

If the official rate were collected on all imports, the collections for the ith tariff item would be:

$$\text{Collected rate}^i = \alpha + \beta * (\text{official rate}^i) + e^i,$$

with $\alpha = 0$ and $\beta = 1$. We start with this simple model in the first line of Table 6. For each country, the slope (the response of collected rate to a change in the official rate) is both substantively and statistically much less than one[9]. An increase of ten percentage points of the official rates produces an increase of only 3.3 percentage points in the collected rate for Pakistan, 4.9 for Kenya and 4.7 for Jamaica. While this may seem obvious and important, many simulations of revenue loss from tariff reforms have relied essentially on the simple model above with $\alpha = 0$, $\beta = 1$.

The subsequent rows of Table 6 verify that this result is robust to econometric variations.

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[9] Given the small standard errors of the coefficient estimates, the t-tests reject the null hypothesis that $\beta = 1$ at any reasonable significance level.

Since at the 5,000 item level many import categories are quite small in value terms[10], we weight the regression by import value to be sure the small coefficient estimates are not being driven by the odd behavior in the data for the smaller import categories. The weighted OLS results in row 2 show coefficients that are in every case lower than the unweighted results. In row 3 we report another weighted regression, this time with the statutory rate as the weight[11]. The coefficients are nearly the same, except for Pakistan, which is much lower.

Table 6: Regression of Collected Rate on the Official Rate

Country:	Pakistan		Kenya		Jamaica	
Functional form of regression:	Coeff. (Std. Err)	R^2	Coeff. (Std. Err)	R^2	Coeff. (Std. Err)	R^2
Linear	0.33 (.01)	0.16	0.49 (.01)	0.21	0.47 (.01)	0.30
Weighted by import values	0.29 (.01)	0.14	0.10 (.02)	0.01	0.28 (.01)	0.16
Weighted by official rate	0.12 (.02)	0.02	0.47 (.01)	0.02	0.50 (.02)	0.20
Linear, excluding observations where CR=0	0.38 (.01)	0.20	0.31 (.01)	0.12	0.50 (.01)	0.31

[10] As noted above, a number of the import categories have zero value. The division of the tariff code leads to code items of intrinsically very different sizes. The ratio of the value of imports in the item of the 75th percentile to those in the 25th percentile is 27 (Jamaica), 75 (Pakistan) and over 1,000 (Kenya).

[11] After all, line 2 of table 4 is a Bruesch-Pagan test for heteroskedasticity linear in the statutory rate. The problem of inconsistent standard error estimates is less serious. The White heteroskedasticity consistent standard estimates produce all the same results, because the standard errors are so small relative to the coefficients in any case.

The fourth row excludes those items for which the collection rate is zero even though recorded import values are positive. These may be tariff items that have a positive official rate reported but have been uniformly excluded from tariff collections for some reason. These items would perhaps be more accurately counted as items with a zero rate and this might create a downward bias. This procedure of excluding all items with a zero rate will, however, also exclude items for which a tariff actually was in force but all imports received an individual exemption. This will produce an upward bias in the slope. The fourth row shows that the coefficients are increased slightly, but not dramatically, for Pakistan and Jamaica and are lower for Kenya.

The regressions in log-log form produce no better overall fit and in percentage form the conclusions are roughly the same.

V) Might rates be over the Laffer Curve?

A reduction in tariff levels could actually increase revenue if increases in the tariff rate above a certain level reduce the collection rate[12]. This is one way of producing a 'Laffer Effect.'[13] Our results provide some evidence that substantial parts of the tariff code for Pakistan are on the declining revenue portion of the Laffer curve: in general, collection rates fall

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[12] This is a sufficient, but by no means necessary, condition. Since tariff revenue (TR) is equal to the ad valorem collected rate times the import value (MV), TR=CR*MV then the total differential is dTR/dt = CR*dMV/dt + MV*dCR/dt. Usual analysis focuses on the dMV/dt term, which depends on the elasticity of tariff value w.r.t tariff changes.

[13] The Laffer curve shows the relationship of tax revenues to the tax rate. For example, for an income tax by assumption zero revenue is collected at 0 percent tax rate and, plausibly, zero revenue is collected at 100 percent rate, which implies that tariff revenues are at a maximum for some rate between zero and hundred percent taxation.

as the official rate rises. The first column for each country in Table 7 allows the introduction of a spline[14], which allows the slope of the relationship to be different above and below a given level of the tariff. Algebraically if t^* is the turning point:

$$CR^i = \alpha + \beta*(OR^i) + \beta 1*(OR^i - t^*) + e^i,$$

where CR is the collected rate and OR is the official rate. The slope of the relationship between collected rates and official rates below the rate t^* is β, while above the rate t^* the slope is $\beta + \beta 1$. For all three countries we find strong evidence that the slope falls as the official rate rise. For Pakistan below a tariff rate of 80% the estimated slope is .6 while above that point the slope is actually negative, -.02[15]. In Jamaica the slope falls from .43 to .11 above 40%. For Kenya below the kink point tariff of 60 the slope is .58 while above the slope is only .25.

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[14] A spline regression allows the regression to have a different slope above and below a certain point. The function is continuous but without continuous first derivatives as the slope jumps at the kink point.

[15] As shown by the standard error, in each of the cases the differences of slope are statistically significant, but the smaller slope may or may not be statistically different from zero.

Table 7: Non-linear Terms in the Collected Rate - Official Rate Regression

	Pakistan		Kenya		Jamaica	
	Spline	Quadratic	Spline	Quadratic	Spline	Quadratic
Official rate	.60 (.02)	.60 (.02)	.58 (.025)	.51 (.05)	.43 (.02)	.39 (.06)
OR above t*	-.02 (.03)		.25 (.04)		.11 (.05)	
Quadratic term		-.0015 (.0001)		-.00028 (.00043)		.000 (.000)
t* or turning point	80	200	60	1000	40	N/A
R^2	.22	.20	.21	.21	.29	.29

The second column for each country shows the result of the quadratic regressions, which allow the slope to change over time. Again there is some evidence of non-linearity[16]. The rate at which the collection rate rises as the tariff rate increases falls, and ultimately becomes negative for Pakistan and Kenya[17]. The estimated turning point for Pakistan is 220.

The data for Kenya are unusual. In Table 2 we see that the collected rate actually falls from 43 percent for items with an official rate of 60 percent to 31 for 80 percent items and 36 for 100 percent items. This would suggest a sharp downward slope. However, there are also 22 (of 3,400) items with a tariff of 135 percent for which the collection rate is 117 percent. These observations weaken the statistical findings of non-linearity.

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[16] Another indication of non-linearity is that the Durbin-Watson statistic is quite low, when the data are ordered prior to estimation by the official rate.

[17] If the model is CR = α + β *OR + β1*OR^2, then the slope is dCR/DOR = β + 2β1*OR. The turning point of the regression is -β/2β1.

The data suggest that the relationship is non-linear, such that the increase in the collection rate for a 10 percentage point increase in official rates is much smaller for higher rates than lower rates. We did not find strong evidence of Laffer effects in collected rates alone (a very weakly sufficient condition) but non-linearity adds an additional channel for Laffer effects to appear. In any case, this non-linearity of collected rates and official rates has important implications for the revenue consequences of "concertina" type tariff reforms that push rates down from the top (and up from the bottom).

VI) Are these countries special?

The three countries for which analysis is presented are simply those for which we were able to acquire data on tariffs, import values and revenue at the detailed level necessary. We suspect that these countries are typical and that the wide divergence between individual items' official rates and the collection of revenue is a common feature of pre-reform tariffs. We present two pieces of evidence for this view: comparisons of aggregate revenues versus hypothetical revenue across countries, and studies of exemptions in a number of countries.

The import weighted average tariff rate gives the ratio of hypothetical revenue to imports, that is the ratio of total tariff revenue to import values that would result if import duty were fully collected at the single official rate on all imports. It has been widely noted that the import weighted average and the aggregate ratio of revenue to collections diverge widely. In earlier work, we (Pritchett and Sethi, 1992) find that for the eight countries for which we can calculate

both the trade weighted average and the ratio of import duty to imports[18], the excess of hypothetical revenue over actual varies from quite small (55% vs 51% for India) to immense (32% vs 7% for Brazil). Nogues and Gulati (1992) give the ratio of the weighted average tariff rate to collection ratios in three Latin American countries (in a pre-reform year) as Argentina (1988) 39 percent vs. 17 percent, Costa Rica (1988) 16 percent vs. 7 percent, Peru (1989) 45 percent vs. 16 percent[19].

Kostecki and Tymowski (198) review import weighted average tariff and the collected rate (they call the "ad valorem incidence") and find substantial divergence between the two, with collected rates generally half or less the trade weighted average. The magnitude was quite different across countries: in 1977, the trade weighted average in Venezuela was around 27 percent while collections were 4.7 percent whereas the trade weighted average in Colombia was around 22 percent, but collections were 12.3 percent. Erzan, et al, (1989), in a review of the structure of protection for a large number of LDCs as of 1985, give the average import-weighted level of tariffs[20] at 30 percent, ranging from 66 percent in Central America to 5 percent in West Asia. A comparison with figures from the IMF's Government Finance Statistics[21] for

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[18] In this case the import duty information is coming from the IMF's GFS, as we don't have actual collections data.

[19] This combines information from Nogues and Gulati in table 3.10 and tables 1.1, 1.3 and 1.5.

[20] This includes what they refer to as "para-tariffs," non-import duty charges levied on imports such as; customs charges, stamp taxes, taxes on foreign exchange transactions, etc., but excluding sales or excise taxes.

[21] This compares the ratio of GFS line 6.1 Revenue from Import Duties to IMF IFS line 71, Imports CIF in local currency.

similar years finds average collection rates generally between 10 percent and 20 percent (except for a few high collection countries like India).

Direct evidence on the amount of tariff revenue lost to exemptions is difficult to come by. Exemptions, including preferential lower tariff rates which are partial exemptions, are granted for a wide variety of reasons: country of origin (e.g. customs unions, or the GSP), end-use (e.g. imports for exports), type of importer (e.g. charities, parastatals), type of financing (e.g. donor financed imports, foreign investment), or simply discretionary exemptions granted for worthy causes. Data show that in 1988, Brazilian parastatals paid almost no tariffs (.5% of import value) while private firms pay a substantial tariff (13.4%), although this is still a small fraction of the import weighted tariff (39.8%). Foroutan (1990) examines import exemptions in Argentina and finds a large amount of revenue lost to exemptions of various types. A study in 1988 in Tanzania found that one third of all exemptions were made under the discretionary authority granted to the Minister of Finance.

We have data from Cote d'Ivoire on the tariff rate, import values and the value of imports fully exempt from tariffs, although no information on revenues. The proportion of import value exempt increases significantly with the level of the official tariff (see Table 8). For India we have data on import tariff levels and collected rates, but only aggregated to the two digit level. Here again we find that the collected rate increases at a much less than one for one level with increases in the official tariff as well[22].

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[22] There must be some bias as a result of aggregation, but we haven't figured out which way it goes.

Table 8: Regressions for Countries without Detailed Revenue Data on the Official Rate

Country:	Cote D'Ivoire	India
Dependent Variable	Percent of fully exempt imports in total import value	Average ratio of collections to imports at two digit chapter
Official Rate (standard error)	.26 (.042)	.24 (.08)
R^2	.016	.09
Number observations	2507	92

The available evidence suggests that exemptions are a prominent feature of pre-reform tariff systems in many, if not most, countries.

Implications and Conclusions

As usual, correctly interpreting the implications of our four facts is more difficult than documenting the facts themselves. These results have implications in two areas of tariff analysis, revenue and protection.

The distinction between changes in tariff rates ceteris paribus (that is, holding all other aspects of the tariff regime constant) and a change in tariff rates simultaneous with other changes (e.g. changes in procedures for receiving exemptions) is important. An easy conclusion is that a calculation of the revenue implications of tariff rate change that calculates hypothetical revenue under the existing tariff and hypothetical revenue under the new tariff rates is probably worse than useless[23]. If the change in rates is in fact ceteris paribus then this calculation will vastly

[23] This kind of calculation was quite common and the SINTIA software distributed by the Bank facilitates this calculation, although more correct calculations are possible by downgrading imports by exemption status.

overstate the revenue lost. For instance, in Table 2 we see that for Pakistan the revenue foregone from a concertina reform that lowered all rates down to 80 would in fact be minimal as the collection rates essentially level off at 50% anyway. The "hypothetical revenue lost" under the standard assumption would be the total import value of those items above 80% times the difference between the previous tariff and 80%, which is a substantial number. In Kenya, given that collected rates are lower for high tariff than moderate tariff items, moving those items to lower rates would actually increase revenue[24] rather than the massive loss a "hypothetical revenue" calculation would suggest.

Of course tariff reform generally includes broader treatment of the tariff regime than just a change in tariff rates. If that is so, the relationship between collection rates and official rates might change if, for example, exemptions were curtailed. The implications of our results for more general revenue calculations are twofold. First, rates are not the critical determinant of revenues. The revenue implications of large changes in rates can be offset by modest changes elsewhere in the system of exemptions, and areas such as smuggling or underinvoicing and false customs declarations have not even been discussed. Second, the pressures that lead collected rates not to increase one-for-one with tariff rates will continue to be present in any tariff regime.

Many exemptions are actually "tax expenditures" and a collection of the tax and allocated expenditures elsewhere would be a wash in the budget. For instance, an exemption from import duties for exporters will be roughly equivalent to a duty drawback that collects the revenue and then pays it out again to exporters. A tariff exemption to government agencies essentially

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[24] If those new items then had the same collection performance as other items at the same rate. This may not be true if a high rate and exemptions were acting as a discretionary quota (see the discussion below on the protection implications).

allocates income to them from the foregone import duties and a collection of the duty with offsetting increases in their budget would produce the same effect. In these cases the benefit of eliminating exemptions is primarily transparency, as the costs of programs that provide import exemptions for say, regional promotion, are often hidden in the customs statistics.

The last area is the implication of the wide divergence between collected rates and official rates for analysis of protection provided by the tariff. An initial inclination is to use the average ratio of collections to import value as the "effective" tariff for an item. However whether or not this is correct depends on why revenues are less than the official tariff. Three examples will hopefully clarify the point.

A) Say the tariff is 50 percent but parastatals are exempt and are responsible for 50 percent of the imports. The ratio of import duty to import value would be 25 percent but the marginal price an importer would have to pay (if the parastatals are forbidden to resell) would be the full tariff of 50 percent and the fact that any imports came in at 50 percent at all would indicate that the difference between the domestic price and the border price is at least 50 percent. This is just another way of saying the obvious: that it is the marginal, not the average, price that matters for incentive calculations.

B) Say the tariff rate is 50 percent but a preferential arrangement stipulates that imports from country X receive a rate of 25 percent. If country X can fully satisfy the demand for the item then the marginal and average tariff is the 25 percent preferential rate and using the ratio of import duty to value would be correct.

C) Say the tariff was 50 percent but a complete exemption was granted to some group (say charitable organizations) but that resale was not effectively prohibited. Then the

marginal and average rate would be 0. However, if some group (say foreign firms) were forbidden to take advantage of the secondary market for exempt imports and forced to pay the full rate and this disadvantaged group accounted for 20 percent of the import value, then the official rate would be 50 percent, the average collected rate would be 10 percent while the marginal rate would be 0.

This adds another reason (to an already long list) why analysis of nominal tariff rates is unlikely to provide much information on protection.

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